

# Hurricane Sandy Aftermath: A Case-Study of Two NYC Neighborhoods

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## Abstract

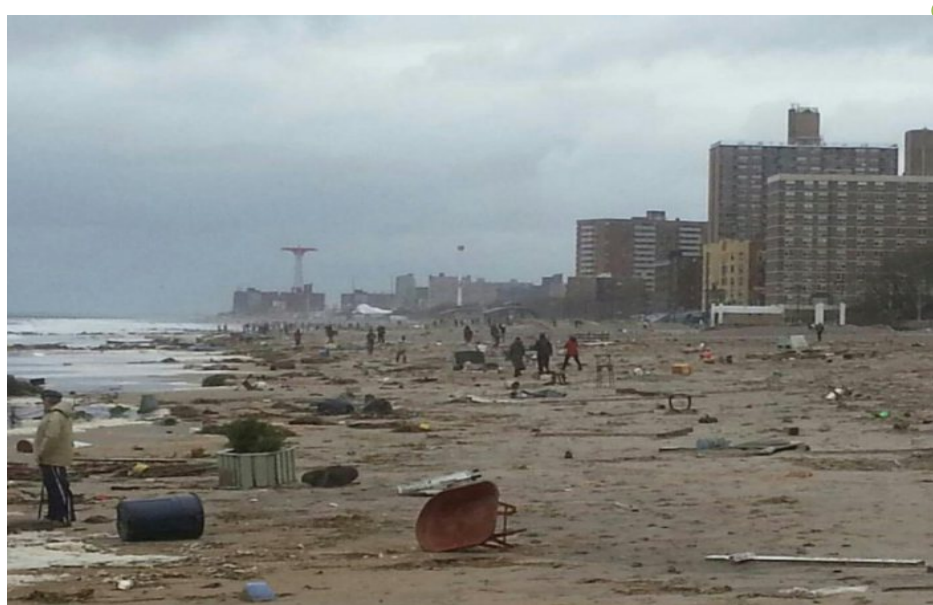
New York City was recently hit hard by Hurricane Sandy at the end of October, which killed more than fifty people and proved that the city was in dire need to update its storm management programs. Mayor Bloomberg announced his project, PlaNYC and detailed the types of protection they are going to enact in certain areas of the city in order to prevent another storm from striking with equal force. However, much of the details the plan goes into were already enacted before the storm and proved to have been less than efficient at preventing damage.

It is evident that if actual progress for storm preparation would be made, more factors must taken into account. For this project we looked at two different NYC neighborhoods to achieve two objectives: 1) to see how communities responded to the storm and how this affected total damage, and 2) to get an idea of other measures the city could take in preventing storm damage by using this community response.

## Introduction

Hurricane Sandy wrecked havoc long the east coast, dismantling hundreds of homes, flooding critical infrastructure, and knocking out power and water for many people. The storm cost NYC over \$33 billion in damages, with 57 killed in just the NYC area. However, its winds only averaged 45-55 mph winds along the southern shores of Long Island. It was the flooding that caused most of the damage: inundation height reached 9 feet at the Battery, and 4-6 feet in Long Island. For this project, we chose two neighborhoods in Flood Zone A that had extensive damage following Sandy, but have been recovering in different ways. We hope to find the community and social dynamics of each area, and how that affects storm preparedness and recovery, as well as the physical storm barriers which would be effective in terms of preventing such extensive damages to these areas looking forward by analyzing the plans prepared by the city and looking for ways to improve it to enhance the plan.

## Neighborhoods

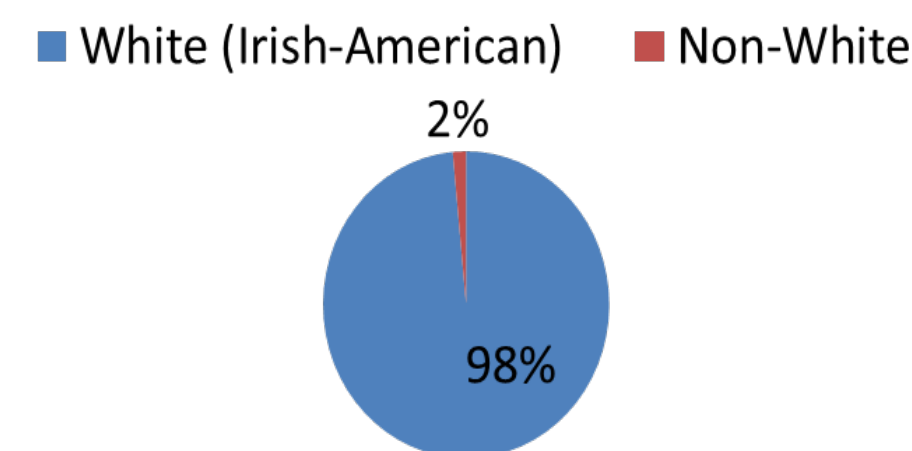


- The area known as Brighton Beach, or District 13, in lower Brooklyn is largely connected by shoreline with the Lower New York Bay. Due to this, there is a lot of commercial property located within it alongside the large residential population of around 72,000 (Onboard LLC 2007). The average income is around \$50,000, however, with 51% of this population collecting cash assistance (TANF), Medicaid, and supplementary security income ("New York City Department of City Planning", n.d.).

The neighborhood contains a mix of residence and businesses due to its status as a tourist destination and proximity to Coney Island. It has the largest immigrant population out of all of NYC, mainly Russians and Uzbeks (New York Times 2011). Brighton Beach is located on the 100-yr flood zone due to its proximity to the water in conjunction with its low elevation (Keef, J., Reeder, S., Melendez, S., and Ma, L., 2013).



### Demographics of Breezy Point



The neighborhood of Breezy Point is located on the tip of Rockaway peninsula in lower Queens, and is a very small community of around 2,800 houses. It is made up of mainly single-family homes, with more “summer homes” than any other NYC neighborhood and its own private security force (David M. Herszenhorn, 2001). Within it, there is a population of 22,000 with an average of \$82,000 in annual income (Onboard LLC 2007). It is also the least diverse neighborhood in NYC (New York Times 2011). Breezy Point is on the 100yr flood plain due to proximity with water on both sides of the peninsula, as well as its lower elevation (Keef, J., Reeder, S., Melendez, S., and Ma, L., 2013).

## Protection Plan

Distance of Coastline for Brighton Beach: 4000 feet  
Distance of Coastline for Breezy Point: 13560 feet

2531.25 tons of sand -- Brighton Beach  
8484.375 tons of sand -- Breezy Point

Cost for one (1) dune:  
Min: \$468.75  
Mid: \$1406.25  
Max: \$2343.75

Brighton:  
Min: \$25,312.50  
Mid: \$75,937.50  
Max: \$126,562.50

Breezy Point:  
Min: \$84,843.75  
Mid: \$254,531.25  
Max: \$126,562.50

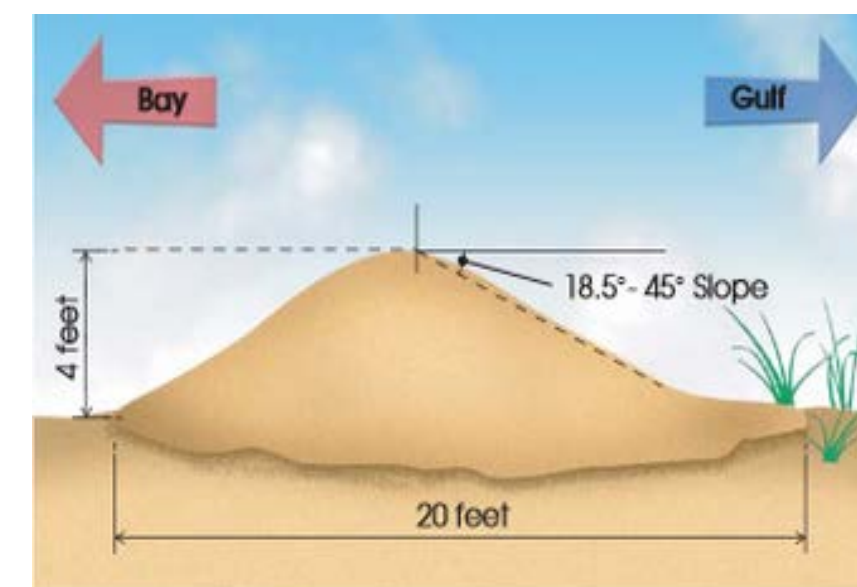
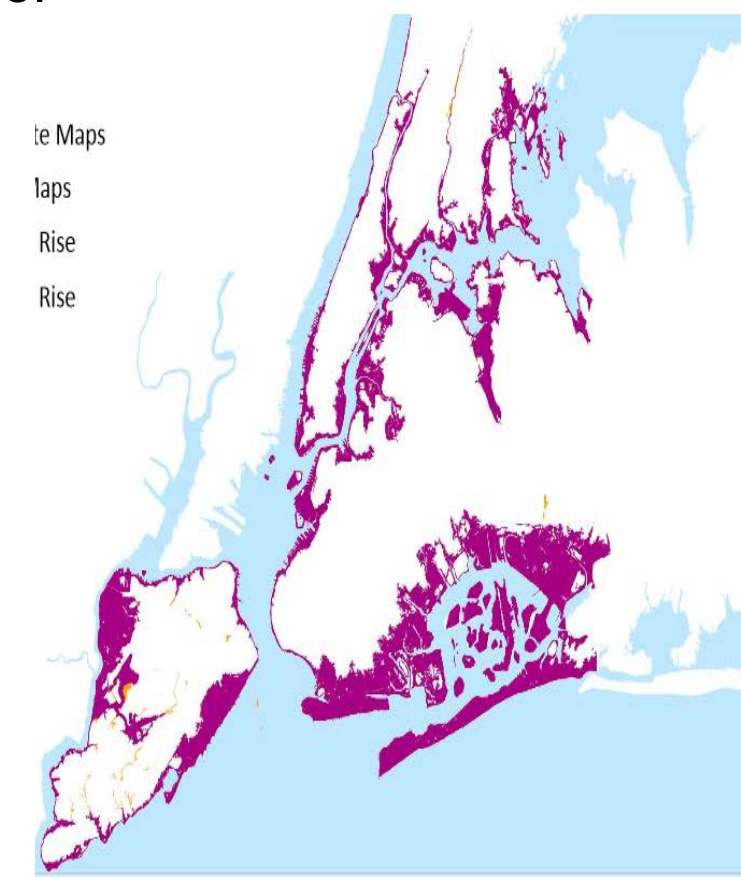


Figure 22. Minimum height, width, and slope of a dune constructed of imported sand.



Projected Storm Surge Height:

Breezy Point 2020

|       | LOW     | MID            | HIGH    |
|-------|---------|----------------|---------|
| CAT 1 | 11.1 in | 13.1 - 17.1 in | 20.1 in |
| CAT 2 | 16.3 in | 18.3 - 22.3 in | 25.3 in |
| CAT 3 | 22.0 in | 24.0 - 28.0 in | 31.0 in |
| CAT 4 | 27.9 in | 29.9 - 33.9 in | 36.9 in |

Seagate 2020

|       | LOW     | MID            | HIGH    |
|-------|---------|----------------|---------|
| CAT 1 | 16.1 in | 20.1 - 33.1 in | 40.1 in |
| CAT 2 | 21.3 in | 25.3 - 38.3 in | 45.3 in |
| CAT 3 | 27.0 in | 31.0 - 44.0 in | 51.0 in |
| CAT 4 | 32.9 in | 36.9 - 49.9 in | 56.9 in |

Breezy Point 2050

|       | LOW     | MID            | HIGH    |
|-------|---------|----------------|---------|
| CAT 1 | 11.1 in | 13.1 - 17.1 in | 20.1 in |
| CAT 2 | 17.0 in | 19.0 - 23.0 in | 26.0 in |
| CAT 3 | 22.5 in | 24.5 - 28.5 in | 31.5 in |
| CAT 4 | 28.4 in | 30.4 - 34.4 in | 37.4 in |

Seagate 2050

|       | LOW     | MID            | HIGH    |
|-------|---------|----------------|---------|
| CAT 1 | 16.1 in | 20.1 - 33.1 in | 40.1 in |
| CAT 2 | 22.0 in | 26.0 - 39.0 in | 46.0 in |
| CAT 3 | 29.5 in | 31.5 - 44.5 in | 51.5 in |
| CAT 4 | 33.4 in | 37.4 - 50.4 in | 57.4 in |

## Social Impacts



During Hurricane Sandy there was extensive damage, but the community itself was experienced with the procedures regarding flood warnings and prepared thoroughly. Veterans to the threat of storm damage and destruction, they were procedural in their response, especially since the area already boasts large and effective relief efforts such as Shorefront, which is now is actually looking to expand post-storm (Vladimirova, 2012). Money also poured in from outside sources, as the city itself later spent more than \$270 million restoring the eroded beaches in preparation for the summer ("Mayor Bloomberg and," 2013).

Breezy Point is largely made of up second homes that are passed down through generation, and because so few people had been present at the time of the hurricane the mortality rate for the neighborhood was low. However, since FEMA doesn't cover second homes many people were left with no way to rebuild.

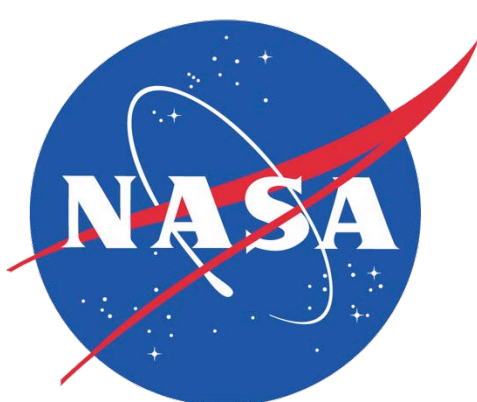


And due to a neighborhood called the 'Wedge', where houses are positioned quite close together, there were optimal conditions for a large fire to break out and more than 100 houses needed to be rebuilt (Hamill 2013). Thankfully, Ireland has given more than \$320k to the rebuilding effort, mainly because the Irish community in Breezy Point keeps close ties (Fessenden & Roberts, 2011).



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